Tables, Charts and Graphs

Data Definitions and Sources

The Washington State Cancer Registry provides the number of new cases (incidence) of cancer as described above. Based on estimates of the expected number of cancer cases, the registry includes more than 95% of cases. Each cancer is coded to an International Classification of Diseases Oncology (ICD-O) code. The data definition provides the ICD-O codes used in each section. We have used definitions which are consistent with those used by the NCI's SEER program.

The Washington State Department of Health, Center for Health Statistics provides information on the number and causes of death from the death certificate. According to the National Center for Health Statistics (NCHS), more than 99% of all deaths occurring in the United States are registered in the death certificate system. Accuracy of reporting specific causes of death varies since classification of disease conditions is a medical-legal opinion subject to the best information available to the physician, medical examiner, or coroner certifying the cause of death. We obtained the number of cancer deaths from the Vital Registration System Annual Statistical Files, Washington State Deaths 1980-1995 CD-ROM issued October 1996.

The underlying cause of death is coded to an International Classification of Diseases, 9th Revision (ICD-9) code. The data definition provides the ICD-9 codes used in each section. We have used definitions which are consistent with those used by the SEER program. For some cancer sites, including colorectal, liver, breast and non-Hodgkin's lymphoma, the SEER coding differs from the NCHS coding which may be used in other Department of Health reports. Therefore, before comparing information from different reports, one must be sure that the definitions are consistent.

We obtained population estimates necessary for the calculation of rates from the Washington State Department of Social and Health Services, Research and Data Analysis. These estimates, called Washington State adjusted population estimates, were released in June 1997 and are based on estimates by Claritas, Inc. and the Washington State Office of Financial Management (OFM). Minor differences at the state and county level between these population estimates and those released by OFM in January, 1997, are due to rounding.

Incidence and Mortality Summary

These tables provide the number of new cases and deaths for Washington State residents in 1994. Since the numbers of new cases and deaths depend, in part, on the size of the population, we converted numbers to rates (e.g., the number of cases per 100,000 people) so that they may be compared among different regions or populations. For diseases, such as cancer, where incidence varies

with age, the rates are usually age-adjusted to minimize the effect of differing age distributions when comparing two geographic regions or populations. Following NCI guidelines, we have adjusted rates per 100,000 population for Washington residents to the US 1970 standard population. More detail on our age-adjustment method is provided in Appendix A. For incident cases, we have provided age-adjusted rates for all cancers and for invasive cancers (see Stage at Diagnosis below). The latter figures are provided to enable comparisons between Washington and the United States.

The final row of each table provides age-adjusted rates for the United States. The incidence rates are from the SEER homepage using the CANQUES program. Except for bladder cancer, these rates include only cases of invasive cancer. The US mortality data were derived from the CDC WONDER program.

Stage at Diagnosis

Stage at diagnosis refers to how far a cancer has spread from its site of origin when it is diagnosed. The stages, in order of increasing spread, are in situ, local, regional and distant. Cancers staged as local, regional or distant are referred to as invasive.

The WSCR data contain the stage of disease at diagnosis coded according to the SEER guidelines.

In Situ	A tumor that fulfills all microscopic criteria for malignancy, but does not invade or penetrate surrounding tissue.
Localized	A tumor that is invasive but remains restricted to the site of origin.
Regional	A tumor that has spread by direct extension to immediately adjacent organs or tissues and/or metastasized (spread through the blood stream) to regional lymph nodes, but appears to have spread no further.
Distant	A tumor that has spread by direct extension beyond the immediately adjacent organs or tissues, and/or metastasized to distant lymph nodes or other distant tissues.
Unknown	Insufficient information available to determine the stage of disease at diagnosis.

We have provided the percent distribution of cases according to their stage of disease at diagnosis.

For most cancers, diagnosis at an early stage (in-situ or local) results in improved survival. Due to the newness of WSCR, we have not developed five-year survival rates for Washington state residents. However, we have provided

the national five-year survival rate (i.e., the proportion of individuals with a given cancer remaining alive five years after diagnosis) for each cancer. These data were obtained from the SEER CANQUES program and provide survival rates both for all invasive stages combined (local, regional and distant) and for local stage at diagnosis.

Age-Specific Incidence Rates

Age-specific rates show the variation in cancer incidence by age group for males, females and the total population.

Incidence and Mortality Rate Trends

These charts provide incidence and mortality rates for several years for Washington residents per 100,000 population, age-adjusted to the US 1970 standard population. (See "Incidence and Mortality Summary" for a discussion of age-adjusted rates.) These tables show both how the rates vary over time and the relationship of cancer incidence and mortality. However, given only three years of incidence data, one needs to be cautious in interpreting the trends for cancer incidence. As more years of data accrue, this type of information will become increasingly helpful in determining whether incidence is increasing, decreasing or remaining constant.

Incidence and Mortality Rates by PUMS Regions

The Public Use Micro-Data Set (PUMS) regions, were developed by the state Office of Financial Management in collaboration with the United States Census Bureau. Each PUMS region had a minimum population of 100,000 in 1990. Under this scheme, the state's nine largest counties are considered individually. The remaining counties are grouped with an attempt to maintain, to the extent possible, cultural and socio-economic similarity within regions. The regions are listed below.

Region 1	Whatcom
Region 2	Island, San Juan, Skagit
Region 3	Chelan, Douglas, Kittitas, Okanogan
Region 4	Kitsap
Region 5	Clallam, Jefferson, Mason
Region 6	Snohomish
Region 7	King
Region 8	Pierce
Region 9	Thurston
Region 10	Grays Harbor, Lewis, Pacific
Region 11	Clark
Region 12	Cowlitz, Klickitat, Skamania, Wahkiakum
Region 13	Adams, Ferry, Grant, Lincoln, Pend Oreille, Stevens

Region 14	Spokane
Region 15	Benton, Franklin
Region 16	Yakima
Region 17	Asotin, Columbia, Garfield, Walla Walla, Whitman

We have presented age-adjusted 1994 cancer incidence and mortality rates for Washington residents per 100,000 population by PUMS regions. (See "Incidence and Mortality Summary" for a discussion of age-adjusted rates.) The state rates and 95% confidence intervals are included for comparison purposes. While the incidence and death data in this report are not subject to sampling error, they may be affected by random variation. The confidence interval is used to describe the range of that variation. The 95% confidence interval describes the range of rates which have a 95% probability of containing the "true" rate.

Generally, when the confidence interval for the area of interest does not overlap with the confidence interval for the comparison area, we say that the two areas are statistically significantly different, i.e., the difference between the two rates is more than that expected by random variation or chance. However, if we are making many comparisons, we may still find what appear to be statistically significant differences just by chance. In fact, with a 95% confidence interval, we expect that 5% of the comparisons will appear to be statistically significant by chance. Thus, with 17 PUMS regions and 24 cancer sites, we would expect to see about 20 instances where the rate for a PUMS region appeared to be statistically significantly different from the state rate just by chance.

Because the rate is not stable when there are a small number of cases, the rate and confidence intervals are omitted when there are fewer than 5 cases. Details of our methods for developing confidence intervals are in Appendix A.

Incidence and Mortality Rates by County

These data are presented in a similar manner to the data for the PUMS regions. However, because of the small size of many counties and the relative rarity of some types of cancer, we are unable to compute a rate due to the small number of cases for many of the counties when we use only one year of data. Therefore, we have combined three years of data (1992-1994) and computed annual average age-adjusted rates. (See section "Incidence and Mortality by PUMS Regions" for technical details and notes on interpretation.)

Data Tables

Each section ends with three pages of data tables. These tables provide data by county and PUMS region. The county table provides the number of new cases and the average annual number of deaths for 1992-1994. The table also includes incidence and mortality rates with the 95% confidence interval, age-adjusted to both the 1940 and 1970 US standard populations. (See "Incidence and Mortality Summary" for a discussion of age-adjusted rates. See "Incidence

and Mortality Rates by PUMS Regions" for a discussion of confidence intervals.) Age-adjustment using these standards is included so that the data are comparable to data from NCI, which adjusts to the 1970 US standard population and to data from the NCHS at CDC which generally adjust to the 1940 US standard population. However, caution must be used in making comparisons among different sources, since coding of cancer sites varies. In particular, we have noted differences in definitions between NCI and NCHS for colorectal, breast, liver and non-Hodgkin's lymphoma.

The tables for the PUMS regions include the same information as the county tables, except that these data are for only 1994. They also include figures for males and females separately.